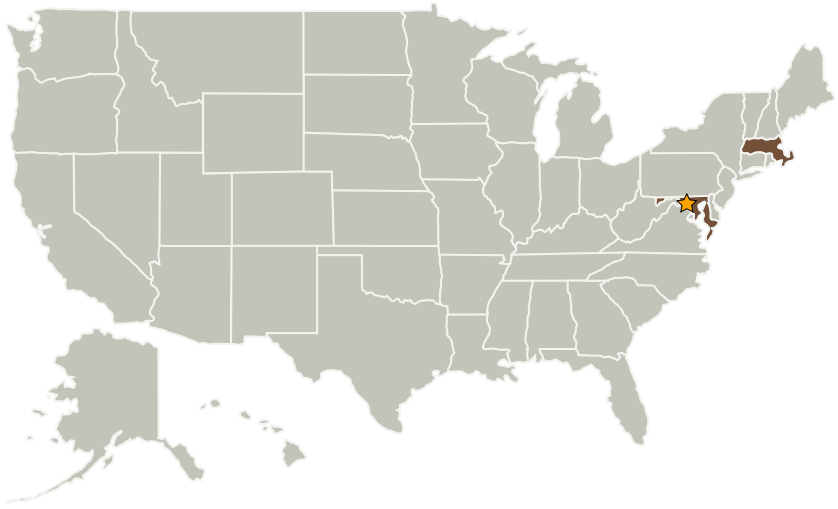
MMIC Cavity Oscillator at 50 and 94 GHz (2007040), Phase II

Completed Technology Project (2008 - 2010)

Project Introduction

An innovative, ultra-low phase-noise, fully integrated single-chip cavity oscillator is proposed. The cavity is built on a standard MMIC process and has a quality factor of 120 at 50 GHz, and an insertion loss of 7 dB. This proposed technique is very well suited for MMW applications with emphasis on the frequency range 50-100 GHz. The achievable phase noise at 50 GHz is -112 dBc/Hz at 100 KHz offset. This is at least 10dB better than the best fully integrated oscillator reported today. To our knowledge this is the first ever implementation of a waveguide cavity on standard MMIC process. This new technique will allow the realization of ultra-small, high-performance integrated oscillators for future market demands. The oscillator can be readily integrated with digital blocks to form a Phase Locked Oscillator (PLO). The PLO will consist of a cavity oscillator, phase frequency detector, prescaler, and a loop filter. All components can be integrated on InP HBT process.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Hittite Microwave Corporation	Supporting Organization	Industry	Chelmsford, Massachusetts

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Maryland	Massachusetts

Project Transitions

February 2008: Project Start

February 2010: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.2 Radio Frequency
    - TX05.2.7 Innovative RF Technologies